

Journal de Physique for March). It shows very well the fringes of a crystal only 2 mm. in diameter and $\frac{1}{4}$ mm. in thickness, and all uniaxial crystals give fringes in it. With the old pincette only two biaxial crystals can be observed (nitre and lead crystal), the limit for the exterior angle of the axis being about 17° ; but in the new instrument, a small calamine plate, with axes $78^\circ 20'$ apart, showed the fringes well.

ACCORDING to M. Angot (*Four. de Phys.*, March) the psychrometer, of whatever form, may give pretty good indications in the hands of careful observers, in these regions (France), so long as the atmospheric pressure is not far from 760 mm., the wet bulb thermometer is above 1° or 2° , and the difference of the two thermometers remains below 12° ; but otherwise the ordinary formulæ become illusory.

THE influence of atmospheric electricity on the vegetation of the vine has been studied near Palermo by M. Macagno (*Four. de Agr. Prat.*) thus: Sixteen stocks were rendered more subject to the effects of the electric tension by means of a copper wire inserted vertically with platinum point in the upper end of the fruit branch, while another wire connected the bottom of the branch with the ground. This continued from April to September. An acceleration of vegetation was proved by the wood of these stocks containing less mineral matters and potash than that of the other stocks, while the contrary occurred in the leaves, and in these the potash was mostly in the bitartrate form. A much greater quantity of must was got from the grapes of those vines, and it had considerably more glucose and less acid.

A DETERMINATION of the electric phenomena which occur on contact of metals and gases has been attempted by Herr Schulze-Berge in Berlin (*Wied. Ann.* No. 2). He worked with a condenser having two circular plates of a given metal, the upper plate being connected with an electrometer and submitted to contact with various gases or to vacuum; the lower connected to earth. The quantity of electricity from a known source requiring to be communicated to the upper plate to make its potential equal to the lower, was measured. *Inter alia*, ozone was found to make gold, platinum, and brass negative to a plate of the same metal in air. Hydrogen always made platinum strongly positive, while its influence on gold was hardly perceptible, and on brass qualitatively various. Chlorine made platinum negative; ammoniacal gas (from aqueous solution) made brass positive. The amount of difference of potential with as similar treatment as possible of a given pair of plates was very different in the several observations of a series. Nor could a certain relation be discovered between it and the time of action of the gas. It was greatest with two platinum plates, one in hydrogen (*viz.* $c \cdot 214$ D). It gradually decreased to a point generally somewhat short of that at the beginning. As to the cause of this decrease, the author thinks it probable that a gradual neutralisation of the electrical double layer takes place.

THE DEVELOPMENT OF HUMAN INTELLIGENCE

THE Department of Education of the American Social Science Association has issued the following Circular and Register, which we commend to the notice of our readers, some of whom may be able to give Mrs. Talbot answers to the questions given below:—

WE have been made familiar with the habits of plants and animals from the careful investigations which have from time to time been published—the intelligence of animals, even, coming in for a due share of attention. One author alone contributes a book of one thousand pages upon “Mind in the Lower Animals.” Recently some educators in this country have been quietly thinking that to study the natural development of a single child is worth more than a Noah’s ark full of animals. Little has been done in this study, at least little has been recorded. It is certain that a great many mothers might contribute observations of their own child’s life and development that might be at some future time invaluable to the psychologist. In this belief the Education Department of the American Social Science Association has issued the accompanying Register, and asks the parents of very young children to interest themselves in the subject—

1. By recognising the importance of the study of the youngest infants.

2. By observing the simplest manifestations of their life and movements.

3. By answering fully and carefully the questions asked in the Register.

4. By a careful record of the signs of development during the coming year, each observation to be verified, if possible, by other members of the family.

5. By interesting their friends in the subject and forwarding the results to the secretary.

6. Above all, by *perseverance* and *exactness* in recording these observations.

From the records of many thousand observers in the next few years it is believed that important facts will be gathered of great value to the educator and to the psychologist.

First Series—REGISTER OF PHYSICAL AND MENTAL

Development of (Give the Baby's full name.)
Name and occupation of the father?
Place and time of father's birth?
“ “ mother's “ ?
“ “ baby's “ ?
Baby's weight at birth at 3 months?
“ “ 6 months? at 1 year?
Is baby strong and healthy, or otherwise?
At what age did the baby exhibit consciousness, and in what manner?

AT WHAT AGE DID THE BABY

smile?
recognise its mother?
notice its hand?
follow a light with its eyes?
hold up its head?
sit alone on the floor?
creep?
stand by a chair?
stand alone?
walk alone?
hold a plaything when put in its hand?
reach out and take a plaything?
appear to be right or left handed?
notice pain, as the prick of a pin?
show a like or dislike in taste?
appear sensible to sound?
notice the light of a window or turn towards it?
fear the heat from stove or grate?
speak, and what did it say?

HOW MANY WORDS COULD IT SAY

at 1 year? at 18 months? at 2 years?

Will the mother have the kindness to carefully answer as many as possible of these questions and return this circular, before July 15, 1881, to Mrs. Emily Talbot, Secretary of the Education Department of the American Social Science Association, 66, Marlborough Street, Boston, Mass.

Boston, March 1, 1881

In connection with the inquiry indicated above, the following letter from Dr. Preyer of Prussia, addressed to Mrs. Talbot, will be found of interest:—

Jena, November 22, 1880

DEAR MADAM,—It has given me much pleasure to read your letter and the extract of a paper of mine on “psychogenesis,” or “the growth of volition, intellect, &c., in infants,” and I readily comply with your wish to have this paper sent off without delay. You will find it reprinted in the book accompanying this letter, p. 199–237. I am about to publish an extensive work on the same subject, which is to contain all my observations and a careful analysis of the phenomena which the development of the faculty of speech presents. This book is to be printed next year. I am sorry to say that a reliable investigator of the whole subject is not known to me. Your newspaper seems to be right in calling the field “as yet almost unbroken.” Prof. Kussmaul’s “Seelenleben des neugeborenen Menschen” (Leipzig and Heidelberg, 1859), and Mr. C. Darwin’s biographical sketch of an infant, contain some good observations, but both are very short. Many excellent remarks on infants and very young children I find in Mr. C. Darwin’s book, “On the Expression of the Emotions.” The German books on the subject, although numerous, are nearly worthless; many are sentimental, giving no facts, or, what is worse, false statements. B. Sigismund’s “Kind und Welt” (1851) is an exception.

The case you mention of a child of eleven months expressing,

its wishes and inducing the nurse to comply with them cannot be definitely looked at as a case of self-consciousness, but only of consciousness. This is one of the most intricate questions to decide—when the child distinguishes its own body, head, hands, &c., from other objects, as belonging to himself. The first time a child says “I” and “me,” in the correct sense, it may be considered to have passed the limit. The formation of ideas by associating impressions, as well as the formation of general ideas (*Begriffe*) by uniting similar qualities of different objects, is intellectual work done by the child long before it knows anything of its own individuality. It seems to me that self-consciousness does not arise suddenly, but by degrees, after many experiments have shown the difference between touching his own body and external objects with his little hand.

I have been occupied with psychogenetical problems since nearly four years, continually collecting facts. Should you be able to awaken some interest for these most important investigations (I mean the physiology and psychology of infants), I think the trouble taken would soon be repaid by the results.

I am, sincerely,

DR. WM. PREYER, Professor

P.S.—Perhaps the observations and experiments on the senses (sight, hearing, smell, taste) of new-born animals and infants which I published in *Kosmos* (Zeitschrift herausgegeben von E. Krause), vol. iii. pp. 22–37, 128–132 (1878, Leipzig), may have some little interest. In England Romanes has written very able papers on the development of instinct and intelligence. His address is 18, Cornwall Terrace, Regent's Park, London.

Yours, &c.,

W. P.

ABNORMAL BAROMETRIC GRADIENT BETWEEN LONDON AND ST. PETERSBURG IN THE SUN-SPOT CYCLE

BEFORE alluding to the subject which forms the heading of the present communication, I must apologise for having allowed some rather serious errors to creep into the figures given for the barometric abnormals of London in my letter to NATURE, vol. xxiii. p. 243. The errors were caused by a friendly computer taking the differences from the mean for each year incorrectly in one or two cases.

I am glad to say however with respect to the relation between the barometric abnormals as there given and the sun-spot numbers, that far from its being vitiated by the corrections which have now been made, they on the contrary considerably strengthen it, as is evident when the following corrected values for the mean cycles are compared with those given in my former letter:—

LONDON

Annual Barometric Abnormals, Mean Cycles

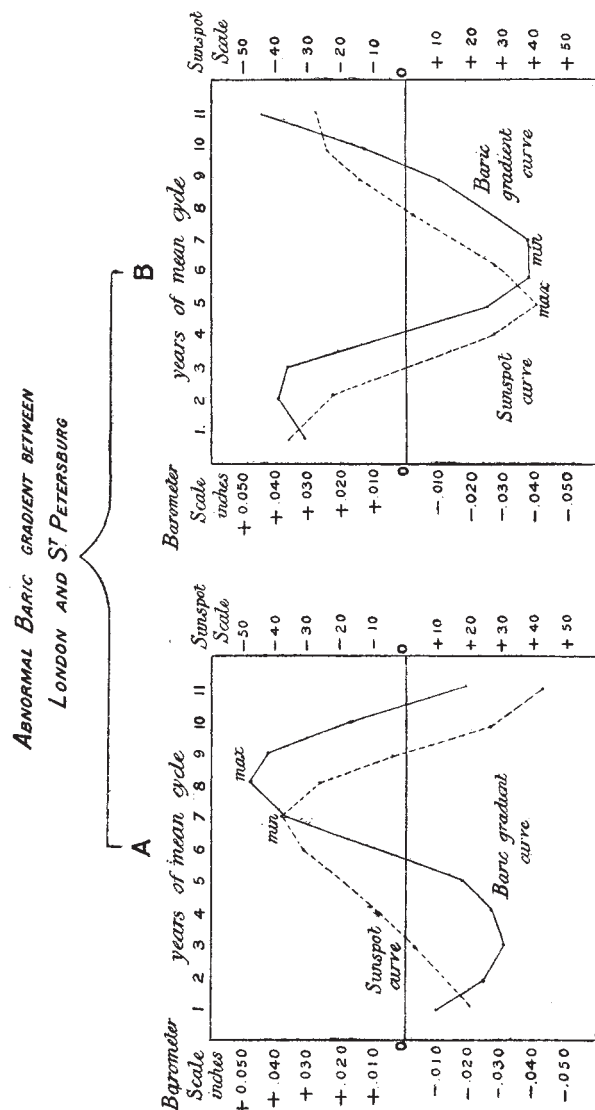
Maximum years in fifth line.		Minimum years in seventh line	
Pressure	Sun-spots	Pressure	Sun-spots
(1811–77).	(1811–77).	(1816–79).	(1816–79).
1. +0'011 ...	-33'9 ...	-0'006 ...	+23'3
2. +0'024 ...	-23'4 ...	-0'003 ...	+14'5
3. +0'017 ...	0'0 ...	-0'002 ...	+4'8
4. -0'003 ...	+28'2 ...	-0'004 ...	-5'6
5. -0'011 ...	+43'1 ...	-0'006 ...	-19'0
6. -0'012 ...	+34'2 ...	-0'002 ...	-32'5
7. -0'008 ...	+16'8 ...	+0'003 ...	-37'1
8. ±0'000 ...	+0'2 ...	+0'020 ...	-25'4
9. +0'002 ...	-14'2 ...	+0'025 ...	+1'8
10. +0'010 ...	-24'2 ...	+0'010 ...	+30'9
11. +0'008 ...	-26'3 ...	-0'009 ...	+44'8

If now we take these corrected figures, and subtract from them those given in NATURE, vol. xx. p. 28, for St. Petersburg (reduced to inches), which comprise very nearly the same period, we get for the abnormal annual baric gradient from London to St. Petersburg in each year of the mean cycle, the following figures:—

Abnormal Annual Barometric Gradient between London and St. Petersburg

(B) Maximum years in fifth line.		(A) Minimum years in seventh line.	
Pressure.	Sun-spots	Pressure.	Sun-spots
London-St. Petersburg (1811–77).	(1811–77).	London-St. Petersburg (1816–79).	(1816–79).
inches.		inches.	
1. +0'032 ...	-33'9 ...	-0'012 ...	+23'3
2. +0'038 ...	-23'4 ...	-0'027 ...	+14'5
3. +0'036 ...	0'0 ...	-0'033 ...	+4'8
4. +0'007 ...	+28'2 ...	-0'029 ...	-5'6
5. -0'029 ...	+43'1 ...	-0'018 ...	-19'0
6. -0'040 ...	+34'2 ...	+0'010 ...	-32'5
7. -0'040 ...	+16'8 ...	+0'036 ...	-37'1
8. -0'025 ...	+0'2 ...	+0'048 ...	-25'4
9. -0'012 ...	-14'2 ...	+0'041 ...	+1'8
10. +0'013 ...	-24'2 ...	+0'016 ...	+30'9
11. +0'043 ...	-26'3 ...	-0'018 ...	+44'8

An inspection of these figures at once reveals the existence of a



baric gradient oscillation of single period, closely following the inverse sun-spot oscillation.